MANURE

APPROXIMATELY 48 MILLION TONS OF MANURE PRODUCED IN WISCONSIN EVERY YEAR

MANURE IS A VALUABLE NUTRIENT RESOURCE BUT IS OFTEN TREATED AS A WASTE

− ADDS ESSENTIAL PLANT NUTRIENTS
− ACTS AS A MULCH / CROP RESIDUE
− ADDS ORGANIC MATTER TO THE SOIL
− IMPROVES TILTH AND STRUCTURE
− INCREASES CATION EXCHANGE CAPACITY
− IMPROVES WATER INFILTRATION

COMPOSITION

MANURE HAS CONSIDERABLE AMOUNTS OF TOTAL NUTRIENTS (TABLE 10.1)

<table>
<thead>
<tr>
<th>NUTRIENT</th>
<th>DAIRY</th>
<th>BEEF</th>
<th>POULTRY</th>
<th>SWINE</th>
<th>SHEEP</th>
</tr>
</thead>
<tbody>
<tr>
<td>NITROGEN</td>
<td>10.0</td>
<td>14.0</td>
<td>25.0</td>
<td>10.0</td>
<td>28.0</td>
</tr>
<tr>
<td>PHOSPHATE</td>
<td>5.0</td>
<td>9.0</td>
<td>25.0</td>
<td>6.3</td>
<td>9.7</td>
</tr>
<tr>
<td>POTASH</td>
<td>10.0</td>
<td>11.0</td>
<td>12.0</td>
<td>9.1</td>
<td>24.0</td>
</tr>
<tr>
<td>SULFUR</td>
<td>1.5</td>
<td>1.7</td>
<td>3.2</td>
<td>2.7</td>
<td>1.8</td>
</tr>
<tr>
<td>CALCIUM</td>
<td>5.0</td>
<td>2.4</td>
<td>36.0</td>
<td>11.4</td>
<td>11.7</td>
</tr>
<tr>
<td>MAGNESIUM</td>
<td>2.0</td>
<td>2.0</td>
<td>6.0</td>
<td>1.6</td>
<td>3.7</td>
</tr>
</tbody>
</table>

(lbs TOTAL NUTRIENT/ton)

ONLY A PORTION OF THE TOTAL NUTRIENTS ARE AVAILABLE IN THE FIRST YEAR

− NITROGEN = 30-35 %
− PHOSPHATE = 55 %
− POTASH = 75 %
RULE OF THUMB FIRST YEAR NUTRIENT VALUES FOR VARIOUS SOLID MANURES (lb/ton)

<table>
<thead>
<tr>
<th>TYPE</th>
<th>N</th>
<th>P$_{20_5}$</th>
<th>K$_{20}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAIRY</td>
<td>3(4)</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>BEEF</td>
<td>4(5)</td>
<td>5</td>
<td>9</td>
</tr>
<tr>
<td>POULTRY</td>
<td>20(24)</td>
<td>30 (24 TURKEY)</td>
<td>24</td>
</tr>
<tr>
<td>SWINE</td>
<td>7(9)</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

(VALUES IN PARATHESIS ARE FOR INCORPORATED MANURE)

RULE OF THUMB FIRST YEAR NUTRIENT VALUES FOR VARIOUS LIQUID MANURES (lb/1000 gal)

<table>
<thead>
<tr>
<th>TYPE</th>
<th>N</th>
<th>P$_{20_5}$</th>
<th>K$_{20}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAIRY</td>
<td>7(10)</td>
<td>5</td>
<td>16</td>
</tr>
<tr>
<td>BEEF</td>
<td>5(7)</td>
<td>5</td>
<td>16</td>
</tr>
<tr>
<td>POULTRY</td>
<td>8(10)</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>SWINE (indoor)</td>
<td>25(33)</td>
<td>25</td>
<td>24</td>
</tr>
<tr>
<td>SWINE (outdoor)</td>
<td>17(22)</td>
<td>10</td>
<td>16</td>
</tr>
<tr>
<td>SWINE (f.n)</td>
<td>13(16)</td>
<td>14</td>
<td>18</td>
</tr>
</tbody>
</table>

(VALUES IN PARATHESIS ARE FOR INCORPORATED MANURE)

WHILE THESE “BOOK ESTIMATES” ARE GOOD FIRST APPROXIMATIONS, AN ANALYSIS IS BETTER

RECOMMENDED PROCEDURES FOR SAMPLING FOR MANURE TESTING

- COMPOSITE SAMPLE FROM SEVERAL SUBSAMPLES. MIX THOROUGHLY. SEAL SOLID MANURE IN ONE GALLON HD ZIP LOCK BAG. PUT LIQUID IN PLASTIC BOTTLE. FILL EACH NO
MORE THAN 2/3 FULL. FREEZE BEFORE SENDING. MAIL ON A M-W.

SOLID

FROM ELEVATOR WHILE FILLING SPREADER

FROM FIELD BY COLLECTING WHAT IS SPREAD ON A PLASTIC TARP

BY COLLECTING FROM A STACK AFTER DIGGING AT LEAST 18” INTO PILE

DIRECT SAMPLING WITHIN POULTRY HOUSES OR OTHER SIMILAR UNITS

LIQUID

SAMPLE FROM STORAGE AFTER THOROUGH AGITATION (2-4 hr. MINIMUM)

FROM FIELD BY COLLECTING WHAT IS SPREAD IN BUCKETS

HANDLING WILL INFLUENCE NUTRIENT CREDITS

NUTRIENTS ARE DISTRIBUTED BETWEEN THE SOLID AND LIQUID PORTION

- NITROGEN: 50% SOLID; 50% LIQUID
- PHOSPHORUS: 95 % SOLID; 5 % LIQUID
- POTASSIUM: 15 % SOLID; 85 % LIQUID

ABOUT 1/3-1/2 OF THE AVAILABLE NITROGEN IS LOST THROUGH AMMONIA VOLATILIZATION IF NOT INCORPORATED
COMPOSTING MANURE MAY REDUCE NUTRIENT AVAILABILITY

- LEACHING FROM THE PILE
- LOSS OF N VIA AMMONIA VOLATILIZATION
- IMMOBILIZATION BY HIGH C:N MATERIALS LIKE SAWDUST, SHREDDED PAPER

SURVEY RESULTS OF WISCONSIN MANURE HANDLING – (UW-CIAS, 1997)

- MOST SPREAD FREQUENTLY (DAILY)
  - 73 % OF DAIRY, 44 % OF ALL LIVESTOCK

- MOST DO NOT HAVE DESIGNED STORAGE
  - 17 % STORE IN A LINED PIT OR TANK

- MOST SPREAD WITHIN 5 MINUTES OF BARN
  - SOIL TESTS ARE EH

- SOIL IS A COMMON BARNYARD SURFACE
  - 50 % HAVE CONCRETE BARNYARD AREAS

THIS PICTURE IS CHANGING RAPIDLY BECAUSE OF EXPANSIONS. MORE EMPHASIS WILL BE PLACED ON PLANNED MANURE MANAGEMENT

MANURE SPREADER CALIBRATION

NUTRIENT MANAGEMENT PLANNING IS GOING TO EMPHASIZE UTILIZATION OF ON-FARM NUTRIENTS
ONE OF THE REQUIREMENTS WILL BE THAT MANURE SPREADERS WILL HAVE TO BE CALIBRATED

- SPREADING UNIFORMITY IS AFFECTED BY SPREADER DESIGN
- MOST NOT DESIGNED TO BE QUANTITATIVE
- DIFFERENT MANURES ON THE SAME FARM
- ESTABLISH SEVERAL DIFFERENT RATES?

METHODS

- WEIGHT PER AREA (NEED SCALES)

(WT. FULL-WT. EMPTY) / AREA SPREAD

(10,000 lb – 6000 lb) x TON/2000 lb x 43,560 sq ft/sq ft spread

- VOLUME METHOD (BASED ON SPREADER CAP.)

BU/LOAD x lb/bu x LOADS/FIELD x FIELD SIZE

300 bu/LD x 77#/bu x TON/2000 lb x NO. LD x FLD/ACRES

- PLASTIC TARP

lb COLL./TARP sq ft x 43560 sq ft/a x TON/2000 lb

- LIQUID MANURES

2800 gal/TANK x 43,560 sq ft/area spread